



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/710,661

07/27/2004

Yoshiki Okayama

NDC.0027

4660

20987 7590 02/11/2008  
VOLENTINE & WHITT PLLC  
ONE FREEDOM SQUARE  
11951 FREEDOM DRIVE SUITE 1260  
RESTON, VA 20190

EXAMINER

PILKINGTON, JAMES

ART UNIT

PAPER NUMBER

3682

MAIL DATE

DELIVERY MODE

02/11/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/710,661	<b>Applicant(s)</b> OKAYAMA, YOSHIKI	
	<b>Examiner</b> JAMES PILKINGTON	<b>Art Unit</b> 3682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Drawings*

1. The replacement drawing was received on 1/15/08 and is approved.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites in the body of the claim "disk-like storage medium." It is unclear how much the medium has to be 'like a disk' in order to anticipate the claim. Does a disc qualify as "disk-like"?

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komura et al, USP 6,771,459, in view of Ishikawa et al, US PGPub 2002/0186903, and further in view of Gomyo et al, USP 6,834,996.

Regarding claims 1, 3 and 5, Komura discloses:

- A housing (13, hard drive case)

Art Unit: 3682

- A motor (102) for spinning recording disk (116) fixed inside of the housing (13)
- A data access unit (C1/L45-50) arranged to read information from the storage medium (66)
- The motor (102) arranged to spin the disk-like storage medium (66) comprising:
  - A shaft (132)
  - A sleeve (134)
  - A micro-gap (space between 132 and 134, see Figure 4)
  - A substantially cylindrical hub (114) which applies a surface pressure to an outer side of the sleeve (134)
  - A gas dynamic pressure bearing (130) in which a pressure generating groove (C5/L26-30) is formed on at least one of the outer peripheral surface of the shaft (132) and the inner peripheral surface of the sleeve (134)
  - A bracket (104) for fixing the shaft (132)
  - A stator (118/120) mounted on the bracket (104)
  - A magnet (122) mounted on the hub (114) and opposed to the stator (118/120)
  - The shaft (132) and the sleeve (134) are made of ceramic (C4/L54-57 and C5/L31-41)

Komura does not disclose that the shaft and the sleeve are made of alumina ( $\text{Al}_2\text{O}_3$ ) and that the shaft is further sintered with titanium carbide (TiC).

Ishikawa teaches a shaft (14) and a sleeve (15) which are made of an alumina ceramic for the purpose providing a bearing which has excellent wear resistance (paragraph 0027 lines 9-10). Ishikawa further teaches that the shaft (14) may be sintered with titanium carbide (paragraph 0026 and 0066) for the purpose of increasing the strength of the ceramic (paragraph 0026).

Komura does not disclose that the hub is made of ferrite stainless steel.

Gomyo discloses that ferrite stainless steel can be used to manufacture the hub (C1/L60-63) for the purpose of reducing manufacturing cost (ferrite steel is the least costly to manufacture) and provide a part that is highly resistant to stress corrosion.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Komura to provide a shaft made of alumina ceramic sintered with titanium carbide ( $\text{Al}_2\text{O}_3$ -TiC) to provide a shaft that is highly wear resistant and as an increased strength and a sleeve made of alumina ceramic ( $\text{Al}_2\text{O}_3$ ) so as to have excellent wear resistant, as taught by Ishikawa. In addition, a hub made of ferrite stainless steel, as taught by Gomyo, for the purpose reducing manufacturing cost and provide a part that is highly resistant to stress corrosion. This material combination results in a device having coefficients of expansion as follows: sleeve < shaft < hub.

Regarding claims 2, 4 and 6, Komura in view of Ishikawa and Gomyo do not disclose that the device satisfies the following equation  $2R_2\Delta T(\alpha_2 - \alpha_1) < \delta$ .

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use values in the range of the equations, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

### ***Response to Arguments***

6. Applicant's arguments filed 1/15/08 have been fully considered but they are not persuasive.

The Applicant argues the rejection set forth above does not satisfy the linear expansion coefficient limitation set forth above. In particular, for the reason that none of the references used above discuss the linear expansion coefficients.

In the above rejection the materials taught to the device of Komura are the same materials disclosed in the specification for the particular components. Because the same materials disclosed in the specification are being taught to the device of Komura the resulting device will indeed have the linear coefficient as that claimed. Regarding Applicant's argument about sintering changing the properties of a material the examiner agrees however Aluminum Oxide-Titanium Carbide is a material made by sintering. Tshikawa does not disclose that components made of pure aluminum oxide are being

sintered the sintering in Tshikawa is being used to produce aluminum oxide with an added material, one of which is titanium carbide.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Pilkington whose telephone number is (571) 272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3682

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. P./  
Examiner, Art Unit 3682  
2/5/08

/Richard WL Ridley/  
Supervisory Patent Examiner, Art Unit 3682